High Performance Computing Software

JPL Internal Seminar Series

Towards a Next-Generation Global Synthesis of Ocean and Sea-Ice Data

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Satellite and in-situ observations are now routinely combined with numerical models in order to estimate the time-evolving oceanic circulation and to address a wide variety of operational and research problems. For climate dynamics analysis, what is required is a synthesis of all available observations over the last several decades using the best possible numerical model. Rigorous low-resolution estimates of ocean circulation are already possible using the existing data base and modeling capability. But these low-resolution estimates lack the ability to resolve many small-scale oceanic processes, for example, flow over narrow sills, western boundary currents, regions of deep convection, and eddies, that are important both for climate studies and for operational applications. I will discuss three recent advances that bring rigorous eddy-permitting estimates of the global ocean and sea-ice circulations within reach: (1) the configuration of an efficient eddying model that achieves a throughput approaching 10 years of model integration per day of computation, (2) the demonstration that initial conditions and surface forcing fields estimated at coarse resolution improve the solution of an eddying model,and (3) the development and deployment of a hierarchy of methods for assimilating observations in a mathematically rigorous way.

For questions, please contact Dan Katz at 4-7359
or see http://pat.jpl.nasa.gov/public/seminars/